MAXIMUM FOOTPRINT, MINIMUM SPACE: A GUIDE TO SMALL-LOT RESIDENTIAL ACCESSORY BUILDING CONSTRUCTION

By

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Abstract

Short of reading several chapters of building codes that lack diagrams, helpful descriptions or layman's glossary of terms, homeowners are without a starting point when constructing an accessory structure such as a shed, fence or deck on their property. This project evaluated industry best practices, analyzed areas of misunderstanding or misapplication of Municipality of Anchorage (MOA) regulations, and developed a user-friendly pamphlet to reference for design and construction of accessory buildings on shared residential lots.

Key stakeholder interviews and community surveys were conducted throughout project planning and execution phases to identify knowledge gaps and pain points. Employing and adapting the pamphlet while constructing a shed that purposefully maximized dimensional limits set forth by MOA and homeowner's association (HOA) regulations for small residential lots produced a succinct, yet comprehensive guide. Thorough research and site surveys identified a lack of understanding of building code terminology coupled with minimal HOA oversight which ultimately led to structures built too close to others, in violation of zoning easements, and even those that create safety hazards by blocking utility shut-off access.

The final academic deliverable is an instructional guide that streamlines the planning process by supplementing building code legalese with detailed diagrams on how to properly position structures, acts a risk mitigation instrument by highlighting common legal exposures, identifies fixed constraints in layman's terms and underscores hazards common to building accessory structures.

Key Words

Shared Lot Building, Shared Lot Construction, Small Lot Construction, Accessory Building Codes, Anchorage Lot Coverage, Shed Building Alaska, Shed Code Anchorage, R-2A Setbacks, Building Setbacks, Allowable Lot Coverage Anchorage, Residential Fencing, Shed Height Anchorage, Sketch of Shed, Shed Elevation, Shed Examples, Lot Line and Building Codes, Foundations in Easement, No-Objection Building, Anchorage Building Codes, Shed Styles, Keeping Neighbors Happy During Construction, Right-of-Way Anchorage, Utility Easement Building, Maximum Square Footage, Accessory Structures, How-To Guide, How To Build a Shed, Shed Codes 101, Anchorage Shed Law, What is a Setback?, Things to Consider During Construction, Backyard Remodel, West Gate CC&R, West Gate Building Code, Right-of-Way construction, Code violation, Covenant violation, How to avoid building code violations, building codes for DIY, DIYer, Deck coverage rules, Non-objection letter

Introduction

The internet has paved the way for do-it-yourself (DIY) handymen and women to cut costs and control quality on projects in and around their home. Building codes can be referenced online and YouTube™ is likely to have a step-by-step video of how to complete portions or all a specific home improvement project. While quality may improve (after a few iterations), with the homeowner feeling pleased with the sweat-equity imparted, the end product may not have the same level of code compliance as if were completed by a licensed professional. While this may not affect the use of the product, it may lead to legal exposure, rework or consequences – sometimes violations severe enough to have to completely move/remove the project build at the DIYers cost.

Background

Analyzing the architecture in several Anchorage neighborhoods there seems to be a universal gap in knowledge and application of the Municipality of Anchorage (MOA) building codes that apply to accessory structures on small and shared residential lots. A deck, storage shed, playhouse, greenhouse and even fences are deemed *accessory structures* in the Anchorage Municipality Code (AMC). Many of the existing structures can, and were, built without permit as they are small and simple enough for the DIY handy person to erect from a kit or built to owner specification. However, construction without understanding of basic guidelines such as setback distances, lot coverage percentages or utility easement right-of-way rules has caused consternation between neighbors, complaints between utility companies and homeowners, and tension between owners and the West Gate HOA – the subject neighborhood. Without a robust, educational guide to help prevent errors homeowners constructing accessory structures in violation of the building code are in danger of inciting legal intervention, violations and fines, or be forced to remove the structures all together.

As the PM sought out to build his own shed, deck and fence it was clear from initial research that the MOA building codes were wrought with pitfalls for a novice builder. For instance; a perspective builder needs to reference thirteen different chapters of AMC to simply identify the square footage, height, and an approved location of each – yet they all qualify as the same category of "accessory buildings."

Research Methods

Composing a useful instructional guide to small-lot residential accessory building construction required learning what foundational knowledge was common among the cross-section of homeowners. Closed question, electronic surveys eliciting responses that fit into predetermined and restricted categories were designed to highlight knowledge gaps, and narrow scope of the guide's content. The survey covered

basics like dimensions of buildings or heights of fences, touched on "neighborly" aspects of if the placement or style was conferred with the adjacent neighbor, and incorporated technical questions on lot-coverage rules, easements and setbacks. The catch-all, and general tell-tale sign of how code compliant the build may be, was how often the answer of, "I don't know," was selected. The PM found that the responses allowed enough clarity to properly identify pain points and knowledge gaps. What grew more apparent was that the more technical the question was, the more responses answered, "I don't know." Furthermore, allowing anonymous survey replies promoted more robust, valid feedback. The full survey as it was conducted is available at Appendix A.

In-person and telephone interviews of stakeholders, building and code enforcement officers, and HOA Board of Directors (BOD) helped define what regulators and high-interest, high-power stakeholders considered to be the most important aspects of a proposed build and its associated permits and approvals. Similar open-ended questions asked by the project manager included the most broken codes or articles, what the most common complaints the authority offices received and how they related to the build (aesthetics, noise, dimensions, timeframe during or after construction for example) and what aspects the code enforcement considered themselves felt was most important. While subjective to the individual authority speaking, the answers received matched homeowner knowledge gaps in technical definitions and to the threat, and potential consequences, of building despite not knowing the regulations.

Research Analysis

Replies to the surveys and interviews were subjectively assigned a weighted score of 1-5 based on importance and potential consequence. This quantitative research required uniformity of questions, tight controls over data collection, and centralized oversight. The project manager (PM) was responsible for all aspects of data collection and analysis to ensure uniformed gathering and scoring. Areas scoring higher in importance coupled with areas with lowest levels of end-user knowledge garnered additional emphasis. Pairing these results with thorough literary research in adult learning theories and pamphlet design showed increased usability for target audiences throughout the phases of pamphlet design.

Furthermore, a sight survey in the target neighborhood appraised the size (estimated height and square footage later validated by written survey) and placement of existing sheds on each plat and made note of any glaring code violations or HOA requirement misapplications. Special attention was given to those households that had accessory buildings that had obvious code deficiencies compared to how they answered the survey questions – provided the data was returned with address or name attached. The underlying goal was to find if the violation was an intentional regulatory non-compliance, or a misunderstanding or misapplication of code, and how to tailor the educational pamphlet to help homeowners avoid code violations with future builds. The resulting deliverable that is distributed as a

succinct, single page document that is rich in graphics and layman's terms to encourage usability while eliminating confusion on what the data showed needed clarification is at Appendix B.

Literature Review

Construction of the shed (the tangible product deliverable) required thorough literature research into Municipality of Anchorage (MOA) building codes for allowable size, positioning and snow load requirements and any additional restrictions in West Gate Condominium HOA regulations. HOA covenants and site survey data was reviewed to define what an acceptable style, size and location of the proposed delivered compared to similar structures in the community. This extensive examination revealed an array of complex "hunt-and-peck" obligations to fully gather all the code requirements scattered through several chapters of MOA building code to remain compliant and revealed the project's first opportunity to benefit the body of knowledge (PMI, 2017).

In search of industry best practice the project manager leveraged "how-to" construction aid material and online tools to find printed or electronic guidebooks, pamphlets, or instructional material

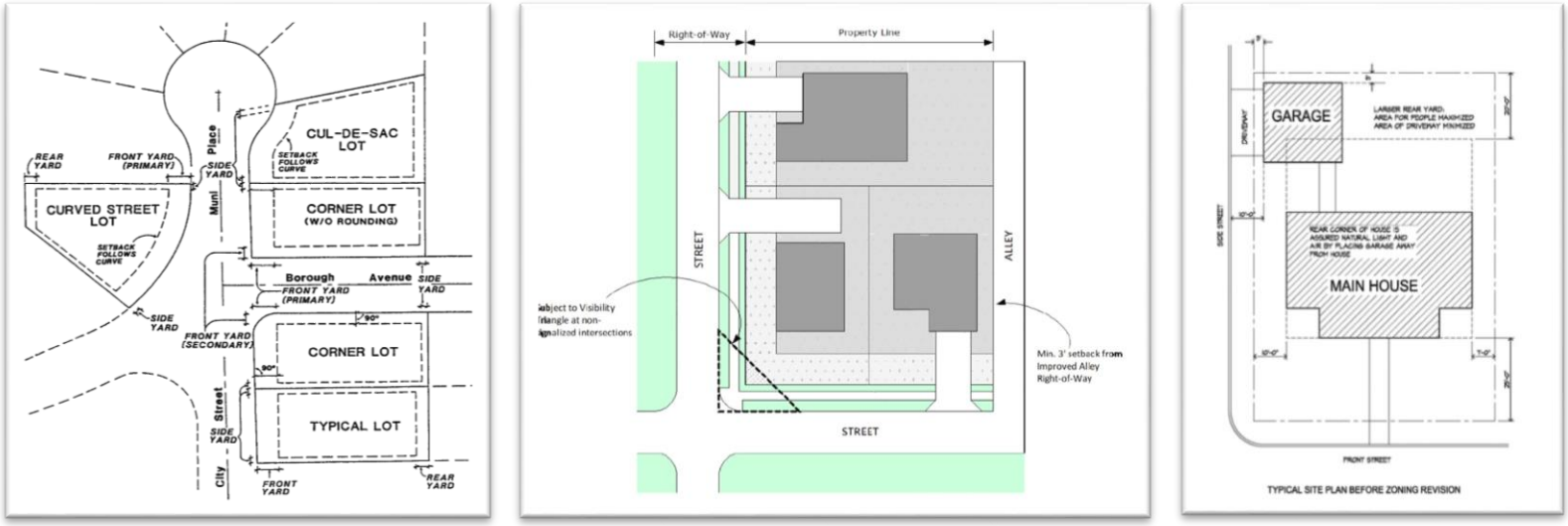


Exhibit 1: Cities like San Francisco, CA and Melbourne, FL attempt to educate builders.

applicable to this subset of residential construction. Comparisons were conducted on usability of several "big city, big budget" examples as found in Exhibit 1 below, coupled with feedback from "do-it-yourself" (DIY) homeowners and local builders. Areas identified as the most helpful in visualizing technical terms as applied to building placement were imperative to the pamphlet's usability.

Stakeholder Management

Stakeholder management was a key performance indicator that influenced several aspects of the project's fundamental decisions. As described in the project title, the goal of the structural build was a shed with a maximum footprint in a barely adequate space that is heavily restricted by HOA covenants and MOA building codes. Because the main product deliverable pushed the acceptable size limits of the MOA building code, and was planned to be 100% larger and 50% taller than any accessory structure found in the West Gate subdivision, it was important that both key and second-tier stakeholders were well

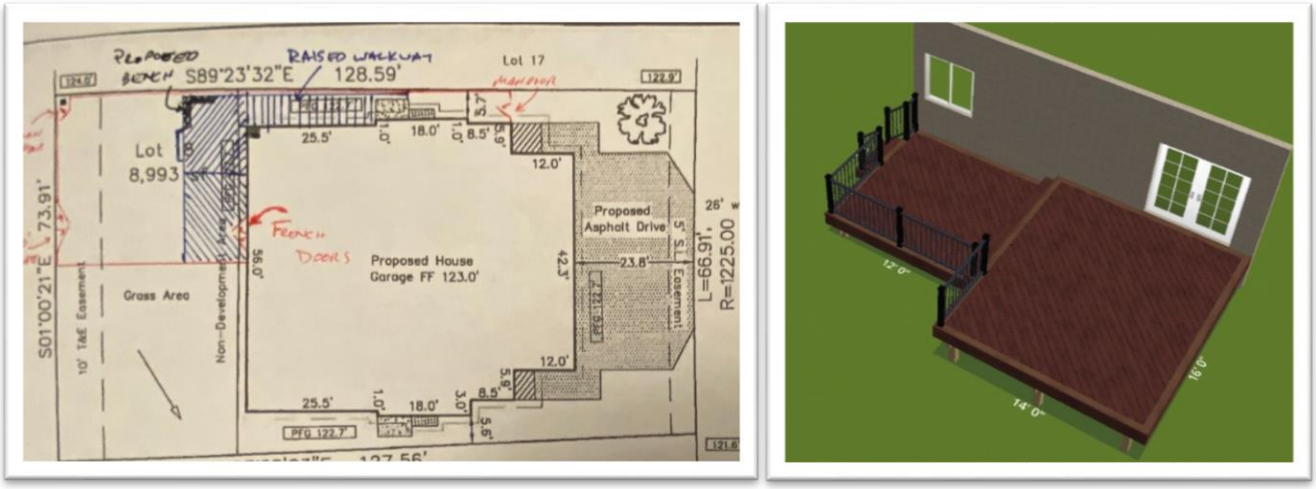


Exhibit 2: 3D and to-scale site plans assist in stakeholder buy-in.

aware that the proposed size and build location was not only allowed by the Municipality, but that the end product would be of quality, fit and finish and location approved by the HOA. Education was a key aspect of the stakeholder management plan and was demonstrated early in the project initiation phase by referencing the pamphlet, to-scale plats and 3D diagrams of how building construction would appear when completed as seen in Exhibit 2.

Early stakeholder management had all high influential parties agreeing to allow construction to occur as planned, or with minimal changes that did not affect the project requirements as listed. Having early buy-in proved beneficial later in the project timeline when material shortages forced / allowed time for major design changes. The location of shed changed three times based on stakeholder input and future building considerations. Each location was marked out and the adjacent neighbors were allowed to comment on the pros and cons of each. The final location was staked-and-strung out at the beginning of the execution phase for stakeholder and sponsor approval.

Stakeholders were identified during the initiation phase and further assessed during the planning phase as exampled in the stakeholder register. Initial feedback from personal interviews and survey feedback showed areas of concern (i.e., sight line blocking, shadowing of grass, proximity to fence), lack of knowledge in building codes and landowner rights, and temperament to allow construction to occur. The stakeholder register was used as a dynamic document to track applicable stakeholders during each phase of the project to include their specific communication requirements, interest or disinterest, and level of support – which is further detailed in the power/interest grid. An example of the communications log is listed below in Exhibit 4 with the complete tables and lists are available at Appendix C.

Stakeholder Communications Log - Maximum Footprint, Minimum Space: A Guide to Small-Lo

	Communications Log					
Other helpful info	Contact 1	Contact 2	Conttact 3	Contact 4	Contact 5	Contact 3
			Internal Stakeholders			
ve in. Talk anytime, but does not want anything to do with academic portion	14-Jan	21-Jan	14-Feb	27-Feb	10-Mar	18-Mar
easure how my project is going - key interest. Will need to show Mastery at variation, risk and value metrics	3-Jan	23-Jan	28-Jan	5-Feb	16-Feb	27-Mar
ullets day prior to discuss, scheduled through Keturah, then phone call	29-Dec	14-Jan	23-Jan	31-Jan	17-Feb	21-Feb
ill assist in formatting, writing and other academic areas only. May provide a Hold Harmless & Release Template	12-Feb	21-Feb	11-Mar	3-Apr	9-Apr	3-Sep
			External Stakeholders			
eds full description, to include depth levels of foundations on an as-built plat	13-Jan	7-Feb				
ll description, with color pics, 3D visuals or mock ups. Must match CC&R requirements	2-Apr	15-May	25-Jun			
Simple narrative in person. Will provide 3D mockups and other umentation to help move the needle from cautious to supportive	11-Feb	14-Feb	29-Feb			
ike a full explanation in person. Has considerable resistance due to poor experience with adjacent	13-Feb	14-Feb	19-Feb	29-Feb	15-Mar	1

Exhibit 3: Excerpt from the Stakeholder Communications Log.

Stakeholder interest proved to be subjective in terms of overall project significance to a person or group, and the assumed or implied impact (positive or negative) of the project deliverables as classified by the PM and sponsor. This information was gathered by the PM by direct interview and survey where the stakeholder has expressed concern or support for the project, implied by the stakeholder's physical proximity to the project, and by any economic impact to them. The stakeholder register and power/interest grid remained consistent throughout the build with only the adjacent neighbor distinctly wavering on support. An excerpt of the Stakeholder Register is in Exhibit 5 below.

	Requirements & Assessment Information						
..t Information	Major requirements	Measures of Success	Level of Power	Level of Interest	Classification	Current Level of Support	Des of su
Internal Stakeholders							
dconner@gmail.com	As per Syllabus				Supportive		
laire@hotmail.com	Most Economical				Supportive		
hull@alaska.edu	As per Syllabus				Supportive		
ard2@alaska.edu	As per Syllabus				Supportive		
vison@gci.net	Conceptual discussions, detailed data, graphics or analytic processes				Supportive		
External Stakeholders							
	Code Compliance				Neutral		
	CC&R Compliance				Neutral		
	View Impact				Cautious		
ivan21@gmail.com	View Impact				Resistant		
	T&E Easement Access				Resistant		
achelectric.com	Code Compliance				Supportive		

Exhibit 4: Excerpt of the Stakeholder Register.

The *Power* portion of the Power-Interest grid was objectively applied to all phases of project in terms of ability to approve a deliverable: 1) late HOA BOD approval for the pamphlet and 2) a descendent neighbor challenging the size of the shed. While these threats were handled according to the Risk Management Plan, it is noteworthy that the initial indications of faltering support were only identified through pre-determined communication intervals high-power, high-interest stakeholders.

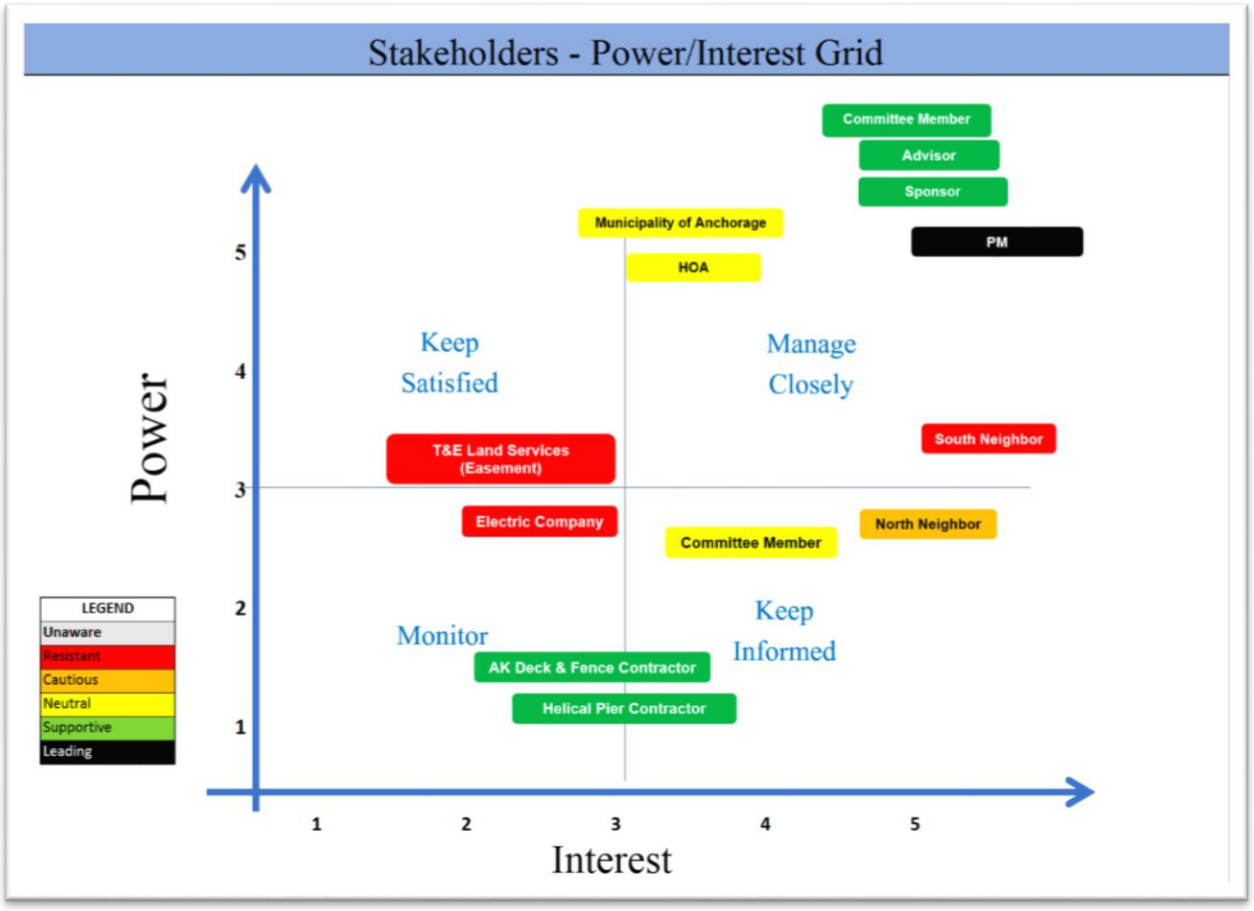


Exhibit 5: Stakeholder Power/Interest grid.

The power-interest grid was comprised of low-to-high levels of interest and low-to-high levels of power – thereby categorizing an individual or approval authority as: high interest, high power; high interest, lower power; low interest, high power; or low interest, high power. An individual or group's position on the grid could have changed during the project lifecycle but remained constant for the stakeholders that were decidedly interested in the *Maximum Footprint, Minimum Space* project. The only change noted was some low interest groups migrating to zero interest and being removed from the grid completely.

MANAGE CLOSELY: high interest, high power parties required maximum engagement at their requested interval and medium to keep or sway a favorable opinion. These stakeholders needed to be managed closely.

KEEP SATISFIED: high interest, low power stakeholder's required engagement tended to taper off as these parties were educated to the project's goals. Those in this area appreciated early requests for

their support, thoughts, ideas and addressing their concerns with facts or modifications to the project. Satisfaction was the key to keeping these stakeholders from forming an adverse opinion of the project.

KEEP INFORMED: low interest, high power were individuals that required fewer visits to keep them informed and in favor. The PM strived to not oversaturate them with contact or information and kept to specific correspondence mediums at set times and only gave them the facts they required.

MONITOR: low interest, low power parties were those who needed monitored and requested occasional updates. Some in this sector disengaged completely after early acceptance of the project's goals.

Product Scope

Project scope was managed through submission of change request forms to, and approved by, a board consisting of the project manager and the project sponsor. The board measured and monitored changes as to best benefit the project as originally baselined and approved. However, COVID-19 and the associated lack of construction materials drove significant changes in project scope. The scope management plan was the responsibility of the project manager, as he retained unilateral authority to accept changes "up to two weeks in duration (individually) and 10% of total project cost." This, too, proved inadequate for the unprecedentedly volatile and often non-existent supply chain of materials required to complete the project build as originally scoped.

The project is divided into phases that matched the project lifecycle of initiating, planning, executing, monitoring and controlling and closeout. Furthermore, the project was limited to calendar year 2020 and the academic semester timing as per the overlay in Exhibit 8. (Bowden, 2016, p.13) The WBS was organized to comply with academic requirements during the spring semester, execute the plan during

the summer months, and closeout during the fall semester and is detailed at Appendix G.

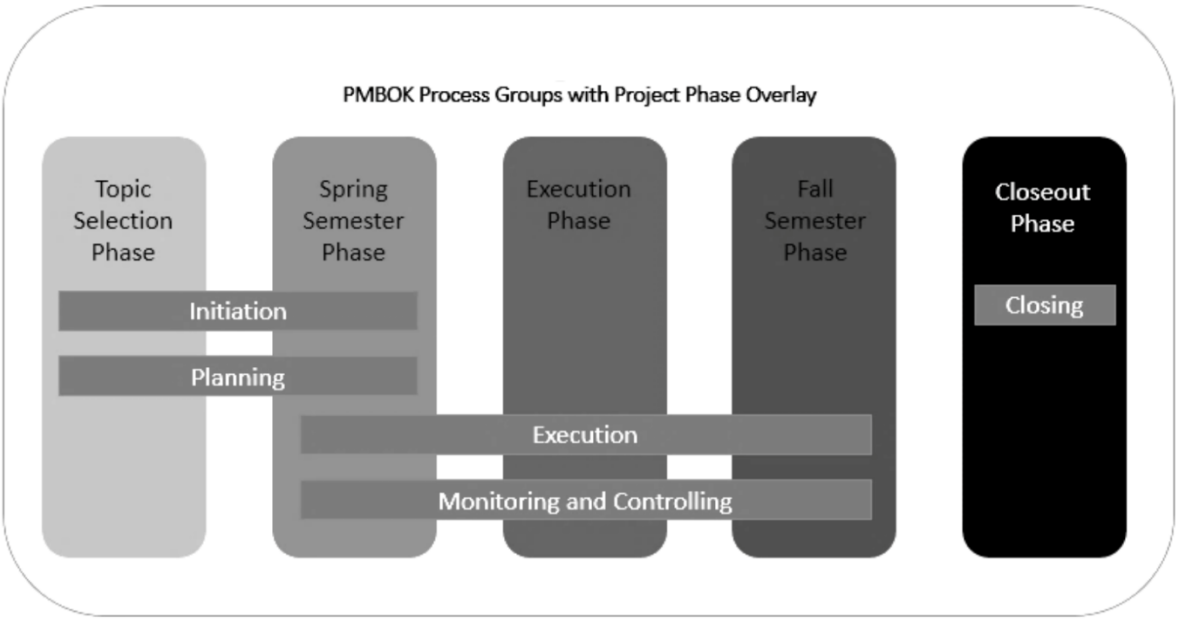


Exhibit 6: PMBOK Process Groups with Project Phase Overlay.

Major extensions to deadlines and descoping of significant portions of the original project plan occurred because of realized risks, both known and unknown, due to the COVID-19 pandemic. Assumptions that seemed like sound expectations – like having rudimentary building materials available – caused missed milestones, deadlines and three separate re-baselining events. Costs increased 95% from what was originally planned, much of that related to unanticipated price increases of 50-70% on lumber. Project phases blended, execution was delayed for up to four-and-a-half months during the execution phase awaiting specialty material, risk management was challenged, and scope management became more appropriately referred to as *de-scope-and-delay management*.

Each month the PM attempted to verify that the project fell within the originally accepted scope. Further review of the project scope by the PM and project sponsor ensured scope creep was minimized and mitigated, but much of the execution phase was burdened by months of no work completed due to the required building materials not being available. Scope management instead became a challenge of not "doing something, for something to do's sake." Idle hands coupled with a PM and sponsor who were the benefactors of the project's product saw the deliverable drifting toward gold plating on more than one occasion. The PM forced himself to commit to "any work not listed in the project schedule and WBS was considered out of scope." After sponsor and project manager approval, the PM rescoped the project as needed, and only as per the change control process. Originally this was to comply with a strict time

constraint the project management plan (PMP) placed on the project as "at no time should scope or work changes exceed an expected Phase I completion date of 14 June 2020." The element of *time* virtually departed the project's triple constraint because of the lack of building materials – one simply cannot build without building material. Changes to the project followed the change control process to document and control the *when* and *why* aspects of each decision for a change to be allowed or denied. The comprehensive change control log can be referenced at Appendix D. The change control process did not overly burden or complicate the need for changes, but with COVID-19 affecting nearly every aspect of the project, forcing extensions to completion schedule there were few reasons to deny a change request. According to the PMP that was written with a distinct do-not-exceed timeline, "Changes, deletions or additions to tasks outlined in the master schedule or WBS do not require a change request during the planning phase provided they do not push the expected Phase I completion date past 01 June 2020." To put in perspective, the shed was to be completely built by 01 June 2020, but had only the helical pier foundation and floor completed by that date Exhibit 8.

Exhibit 7: Helical Pier and Flooring as of 01 June 2020.

Objectives

This multi-phased project involved the development and use of an instructional guide designed to assist homeowners and other novice builders contemplating construction of accessory buildings on small or shared residential lots in the Municipality of Anchorage. The easy-to-use guide, presented in pamphlet form, was designed to help the user visualize where the accessory structure could be positioned and calculate square footage allowed for small residential lots zoned R-1, R-1A, R-2A, R-2D, or R-2M. It includes applicable construction terminology with definitions and graphics to help remain within MOA building codes and is presented in layman's terms with source document references where applicable. The pamphlet was purposefully designed not exceed a two pages (the front and back of one 8.5" x 11" sheet), and was considered acceptable when the content and visual aids functioned adequately, and the verbiage was concise enough to have no questions as to its use or purpose when panel-tested by first-look users. The pamphlet deliverable was deemed a success when the West Gate HOA BOD accepted it for distribution to homeowners petitioning to construct an accessory building on 29 September 2020. The final version is at Appendix B.

The project at West Gate subdivision, Block 11, Lot 18 in Anchorage, Alaska utilized the instructional pamphlet as a fundamental planning aid in positioning and constructing a storage shed which had very specific physical requirements as the main product deliverable for Phase I. The shed had to positioned as to block the view from the park west of the home into the master bedroom window, had to avoid building inside of plat setbacks where permissible, and was required to meet many other sponsor-set design requirements found in the Project Management Plan located at Appendix E. Portions of construction were permitted through the Anchorage Building Code Enforcement Office including utility and right-of-way releases and letters of no objection, and electricity rough and final inspection. All permitting actions initially funneled through the West Gate Board of Directors as required by West Gate Declarations ARTICLE XII at Appendix E, but when the project planning process highlighted this unnecessary step the PM was granted blanket approval to gain permits via himself or licensed contractors. This requirement has since been removed from the HOA covenants.

A legally binding and notarized hold harmless and release agreement with the attached shared-lot owner was to be filed with the Municipality of Anchorage prior to the start of the execution phase as a disproportionate amount of the shared maximum lot coverage is now utilized by the PM and there was identified need to limited legal exposure. For example, a maximum build-out rule of 40% lot coverage applies equally to both duplex owners as they share a common lot. This project claimed $192ft^2$ (70%) of the available $272ft^2$ buildable allowance by MOA Title 21: Land Use Planning, Chapter 21.06.020{B} for the subject lot. Unfortunately, a shift in in project support from the shared-lot owner has this requirement delayed indefinitely. While it was the "neighborly" thing to accomplish, there are no legal grounds for the

shared-lot owner/project stakeholder to reject the build after-the-fact. The project was able to proceed to execution and construction as planned; however, the iron-clad insurance of a hold-harmless agreement remains deferred. As per the PMP, at no time did this project seek legal counsel to challenge restrictions imposed by the attached shared-lot owner (i.e. if only 60% is agreed to as the disproportionate amount of lot coverage), nor was any portion of the project budget utilized on legal counsel outside that of the committee member's previous experience as an attorney offered to the project pro bono. The intent was to achieve a proactive and supporting attitude from stakeholders who hold legal interest in the common plat, while legally recording the unbalanced use of the lot coverage allowances. While not required to record this agreement with the MOA, this action will solidify there was mutual understanding between the owners and mitigates future risk should either party sell their home. This objective is currently pending and may be well into Phase II construction before the shared-lot owner capitulates.

Procurement Management

The maximum cost for Phase I to produce the shed, complete to specifications and capabilities listed, was originally $8,500 US Dollars. Construction was to begin when the HOA Board of Directors (BOD) gave written notice of acceptance of the design and lot plan, a hold harmless and release agreement is signed, notarized and filed with the MOA, and the materials were purchased – which could have been as a whole unit, or as a DIY build whichever proved to be more beneficial through the project manager's limited procurement management abilities. Cost analysis originally showed that the price per square foot for the DIY build was 12.5% less expensive. This, coupled with a backlog in complete shed orders, difficulty delivering an off-site built shed due to lot access, the quoted timeline and additional on-site construction fees in the proposed contracts, and a lack of custom features from contractors the PM and sponsor team decided to build the shed DIY-style. This also allowed full exploitation and examination of the instructional guide.

Project Description

Phase I was defined as creating a guidebook, presented as a pamphlet, and constructing a shed of maximum allowable square footage. Phase II will take place in 2021 and will consist of a deck, remodeling the home to add French door access onto the deck, and full privacy fencing surrounding the back portion of the lot. Phase III will be a greenhouse or raised planting beds, sod and an underground watering system. Opportunities that arose during project execution that would save overall program cost (i.e. setting Phase III underground watering lines prior to deck being built in Phase II, or placing helical pier footings as seen in Exhibit 8 for every required location from all phases to save contractor trip costs) the PM considered on a case-by-case basis through the Change Management Plan. The very specific requirements that were required and built to are in the PMP at Appendix E.

Construction and (Forced) Change Management

Essential construction milestones were having the shed built and weathered in (being able to securely store the required items inside, free from weather related effects) no later than 01 June 2020 and having exterior paint, trim and finish work completed no later than 01 August 2020. These milestones were not met as the predominance of Phase I execution suffered major delays due to a COVID-19 driven shortages of building material. These interruptions in the supply chain cascaded into deferred deliverables and postponed objectives and forced the change management plan to be exercised well beyond what was originally planned.

The fixed budget expanded to $16,575 consequent of a multitude of additional costs including 50-70% increase in building lumber and from approved changes to the fundamental design and finish material. Changes to the shed design included skillion roof, five additional windows, faux rock lower siding, a loft internal to the shed, and additional electrical and interior finish work. The material shortage effected basic items like doors and windows – items that were assumed to remain readily available throughout the execution phase – that, for lack of a better word, vanished. Items remaining local to the Anchorage area saw dramatic price increases or were the higher-end material to begin with. In attempting to maintain the schedule that was time constrained, the decision to purchase the “more-than-enough-for-a-shed” material was accepted through the change control process and the additional funds were approved by the sponsor and PM.

Project exclusions were identified by the PM and sponsor during the initiation and planning phases and incorporated into the PMP. The exclusions list was either retracted due to new regulations or more so expanded because of delays. Examples from the PMP exclusions list included: (1) Will not include finish work to the shed that would require installing interior drywall, insulation, or interior paint; but added (2) Siding, exterior trim and exterior paint. Item (1) was removed from the exclusions list due to a new code enacted by MOA to include a shutoff breaker exterior to the structure that power was provided to. Meaning the original plan of running an electrical subpanel would be $2,500-$4,000 more than budgeted and require metal-clad cable interior to the shed. However, this cost could be reduced to within budget tolerance if a simple extension of a single circuit was run from the main electrical panel, and the interior of the shed was finished in sheetrock. This was the accepted alternative chosen utilizing the change control and risk management processes. What was not able to be accepted were several weather dependent items as found in item (2).

The list of exclusions was expanded (project descoped) to include finalizing the siding and exterior trim and paint because of the realized risk of winter weather. The delay in exterior finishing

material pushed the project into winter months and was outside the anticipated threat of "*weather delay"*. During the project planning, and well into project control phase, this threat was defined as days or at most a week of rain, wind or other weather-related phenomenon that would cause recoverable impact to the work schedule. A four-month delay in required material was not anticipated or accounted for and the project was accepted as complete at the 84%-from-original work complete mark. All exterior finish items are postponed until Spring, 2021, and were descoped from Phase I of the project.

Risk Management

The two most significant risks realized during the project were lack of available time from PM as a resource and delays in building material. The risk management plan in the PMP was structured to predict and mitigate many anticipated threats based on construction industry best practices and organization process assets the PM gained in previous home construction projects. What was not accounted for were the rework due mistakes, minor injuries and lost work because of performance degradation that had a noticeable uptick toward the end of project execution. The PM attributes much of these mistakes to fatigue and the resulting deterioration of safety protocols and decrease in cognitive performance.

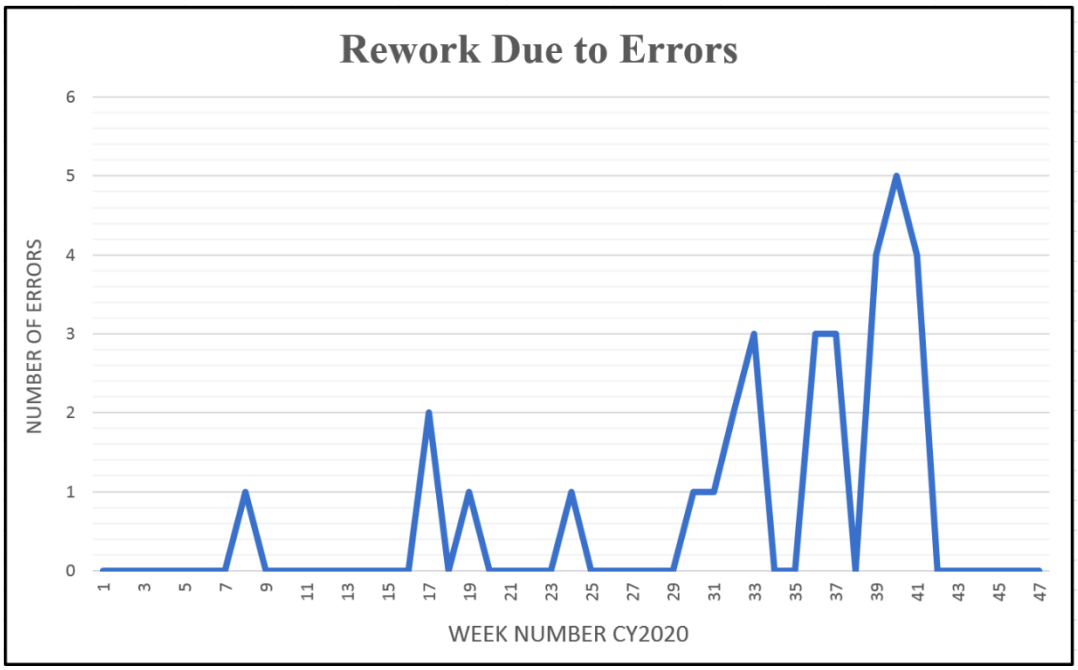
The National Sleep Foundation and Center for Disease Control and Prevention have published studies that are clearly relate a lack of sleep and resulting fatigue to, "decreased alertness, increased fatigue, lower cognitive function, increased injuries" (US DOL, 2019). The PM, who has considerable outside responsibilities as was the sole resource on the project, started the project off strong with minimal mistakes, constant alertness to potential threats to personal and project safety. This high alertness eroded as the delays halted project progress while demands from the PM's primary career increased significantly as a COVID-19 essential worker.

In the last six weeks of project execution the PM was averaging 55 hours per week of work outside the jobsite. The additional 10-15 hours of labor per week put into construction of the shed led to over 60% of the project mistakes and eight percent cost increase. Itemized mistakes included miscalculations on cuts leading to additional work, rework due to incorrect placement or spacing of material, damage to tools due to carelessness, injury resulting in lost work for over four hours, and incorrect purchase of fasteners (whether miscalculation due to amount required or size).

As the project entered calendar week 37, the PM assessed the trend of rework and opted to enact Occupational Safety and Health Administration (OSHA) guidelines regarding overtime. In researching work rules the PM was surprised by the fact that there is no set limit on hours worked per day or week (US DOL, 2019). However, there are multiple studies showing negative impacts to continuing to work long hours while fatigued with several symptoms matching the trends happening on the *Maximum*

Footprint, Minimum Space project worksite. OSHA guidelines state, "…the symptoms caused by excessive overtime can cause a higher chance of accident, of operator errors and of injuries." (US DOL, 2020) These trends were assessed as an unacceptable risk to the project and the PM himself since injuries sustained on the jobsite could affect his main career and income. Following OSHA guidelines, the decision to "reduce the number of hours per day worked and increase the number of days," while detrimental to the schedule, was put into practice. At the midpoint of week 40, the PM self-limited physical duties to no more than ten hours a day between all competing career/project responsibilities and accepted the delay in the project schedule and the resulting missed milestones.

Exhibit 9 below details and helps visualize the spike in errors and the costs associated with fatigue-based threats in the project. In total there were 31 noteworthy errors that accounted for $1,693 (10%) in overages. Note: minimum work was conducted between work weeks 18-29 due to lack of raw building material.



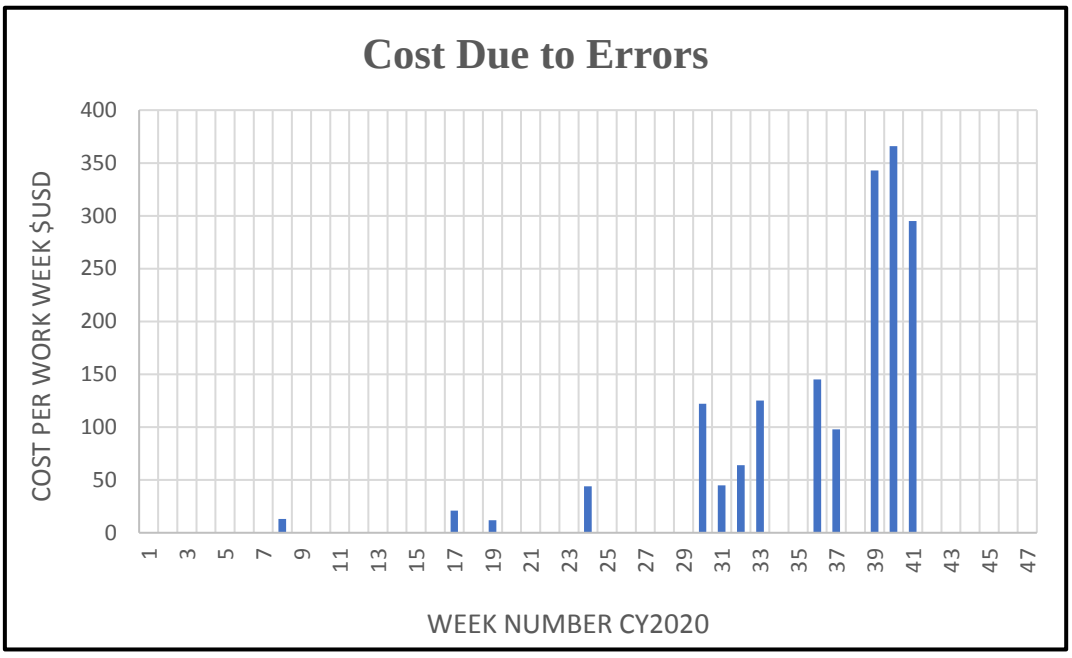


Exhibit 8: Errors registered during the project spiked toward completion.

Quality Management

Quality is one of the triple constraints of project time, cost, and quality, but was planned as tertiary in significance in *Maximum Footprint, Minimum Space: A Guide to Small-Lot Residential Accessory Building Construction* as it is, ultimately, just a shed. However, the processes and activities

outlined in the Quality Management Plan were designed to ensure that the deliverables and project management processes met the quality standards identified by the Project Manager and where required by MOA building code. Quality was managed according to the Quality Management Plan in the PMP.

Quality Control of structural aspects of *Maximum Footprint, Minimum Space: A Guide to Small-Lot Residential Accessory Building Construction* followed the construction guidelines specified in the MOA building codes. Raw material quality was assured by the Project Manager by accepting only the highest quality building materials for the construction. Any material that is identified by the Project Manager's expert opinion as sub-grade was exchanged or returned.

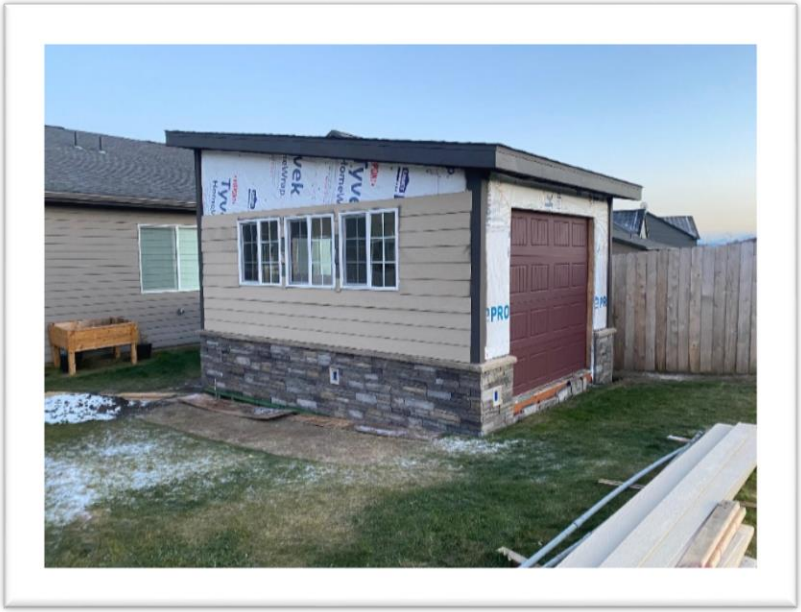


Exhibit 9: Quality of the build is significantly better than originally proposed.

Scope and physical requirements were clearly articulated by the sponsor for the quality, dimensions, and expected storage capabilities of the shed as found in the scope description and Requirements Traceability Matrix at Appendix F. The quality (and cost) of the build increased proportional to the budget and the additional time the PM had awaiting other required building material, and was at times forced onto the project as choices in material became very limited – many times only the most expensive material being available. Faux rock wall siding, special-order windows, an interior loft and a more appealing skillion-roof design were incorporated into the build while awaiting basic parts of the original shed design and are represented in Exhibit 10 above. While these extras could not have been added as originally scheduled or budgeted, the decision was made to accept these additional costs to

increase the overall quality of the build. All changes were accepted through the change management plan, change control process and budgetary approvals according to the PMP.

The final quality inspection of the shed was descoped to include only the weathered-in build excluding final trim, caulking, paint or interior finishes as a result of the project delaying into the winter months. The quality of the pamphlet deliverable was managed by the Project Manager by using surveys to identify areas of confusion, approved research methods into industry best practices in adult learning and academic committee feedback. The sponsor accepted the shed product deliverable as complete on 24 October 2020 as pictured in Exhibit 10 above with agreement to postpone originally scoped exterior finish work until the start of Phase II in Spring, 2021. This was not considered project failure by the PM nor the sponsor as the shed is useable to securely store items in its current, weathered-in state. The instructional guide, presented as a pamphlet, was be accepted by the Project Manager as complete when the HOA BOD accepted it 29 September 2020 as a prerequisite document that all future accessory buildings would be given for reference.

Conclusions and Recommendations

COVID-19 was a black swan event that effected every aspect of the project's triple constraint of time, cost and quality for the product deliverable. In conclusion, however, not all aspects were negatively affected. Quality of the DIY-build far surpasses what is available in mass produced, or semi-custom contracted builds. The delays allowed the PM time to invest more time revisiting early phases of the project and adjust the specifications to produce a shed that is unique in fit, form and function with nothing like it in the neighborhood nor available to purchase in the Anchorage area. Cost to build as originally scoped were quoted at 12.5% less for DIY-build than contractor-built but ended at 18% higher than current rates. This was accepted by PM and sponsor who both consider the project a success.

The building site plans, rudimentary blueprints and pictures have been offered to local contractors as something they may consider building as the skillion roof style is currently popular and is less time consuming to build (the time savings coming from simplification of roof lines and trusses).

The research into adult learning theories combined with surveying the local population helped produce an instructional pamphlet that gives the DIY or novice builder a starting point. The PM deemed the pamphlet a success as it was accepted by the HOA BOD, and has seen use on execution of one greenhouse, and been referenced in planning a shed and a deck for two other families adding accessory structures in the Spring. The *Maximum Footprint, Minimum Space* shed is currently referenced in HOA meeting minutes as an example of the maximum size allowed in the HOA. While this is technically incorrect, the shed does look disproportionately big for the lot.

The PM recommends that the pamphlet be part of the welcome package the HOA sends new buyers in the neighborhood rather than the original PMP objective of including it in new-build informational sheets. The housing market and increase in turn over has seen 22% of the homes in the neighborhood be sold in the last six months. Refocusing the delivery method to the HOA rather than the builder ensures all new homeowners receive the pamphlet.

Lessons Learned and Future Developments

An early warning sign that was not capitalized on was the PMs first-hand knowledge of the break in the lumber supply chain. While operating as part of the global supply chain out of Hong Kong, Shanghai and Shenzhen China it was obvious that there would be service interruption to many of the goods that were Made in China. What became the most devastating unanticipated threat could have been mitigated early in the project phase by bulk-purchasing product earlier than forecast and ignoring conventional holding cost mentality.

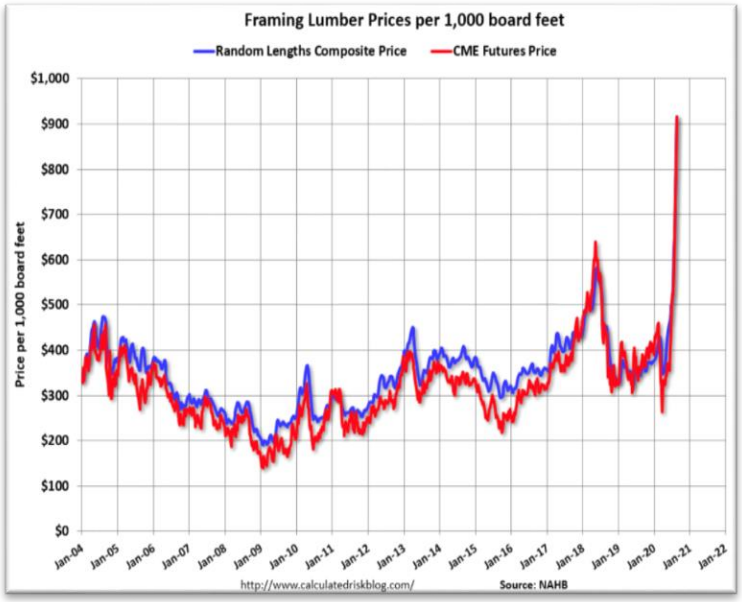


Exhibit 10: Lumber costs rose sharply due to COVID-19.

The green lines in Exhibit 11 are indicative of dates when major building material purchases were made in support of the product deliverable. The PM was first-hand witness to the fragility of the global supply chain in early 2020, well before COVID lockdowns began, and three months prior to the lumber prices spiking. The assumption was that China imports rather than exports lumber, so it was not given due consideration on how it could affect the single most costly line item of the project. What truly impacted the cost of lumber, however, was the supply and demand of American DIY builders and the extra time at

home coupled with big box stores being listed as essential businesses. (Conner Industries, 2020) The demand far exceeded supply and stockouts were commonplace for this project.

Being fixated on just-in-time (JIT) inventory of supplies to avoid carrying cost, and the faulty assumption that basic building material would be readily available throughout the execution phase negatively impacted the project. The PMP was structured with this consideration and without potential threats based on wishful thinking. Future Project Management and Risk Management Plans will have this project to consider as a learning experience and give due consideration to worst case scenarios.

Other future considerations on this type of manual-labor-intensive project is to enact OSHA rules that govern overtime. Safety was annotated as primary concern for the PM in the Risk Management Plan, yet the schedule was the driving factor that called for unhealthy and unsafe amounts of overtime work. A course correction regarding safety factors should have been implemented during week 33 when the PM removed a portion of his finger in what could have been a much worse accident. Beginning at 60% of project completion the PM experienced apparent lack of judgement, multiple counts of rework, and safety related flaws that should have been obvious. A common factor in all these events was that the PM, as the sole resource to complete work on the project, was distinctly mentally or physically fatigued during the event. The PM shall guard against this “get-done-itis” and pushing resources into exhaustion as it is proven to increase accident rates by 16% or more. (Maggiano, 2016) Safety stand-downs are a worthwhile event in the PMs secondary career in the military and will be implemented when these red flags appear within the work force. Acting earlier could have prevented an estimated eight percent cost overage and nearly 40 hours of rework.

Furthermore, an area that was not originally considered a focus area in the Guide to the Project Management Body of Knowledge or demonstrated skill, was the obvious of effect of fatigue on resource performance. When resources are utilized outside the project for much of their alert working time, whether manual labor or at the computer, their effectiveness should be considered less than optimal and scheduled as such. This additional deduction in efficacy is truer to human limitations and will more accurately reflect expected progress and provide a more accurate schedule. The PM suggests that Microsoft Project® include an option to automatically reduce resource effectiveness when overtime rates

are applied as part of the Resource Form internal to Microsoft Project® as seen in Exhibit 11. The PM considered this as the human equivalent the Law of Diminishing Returns (LODR).

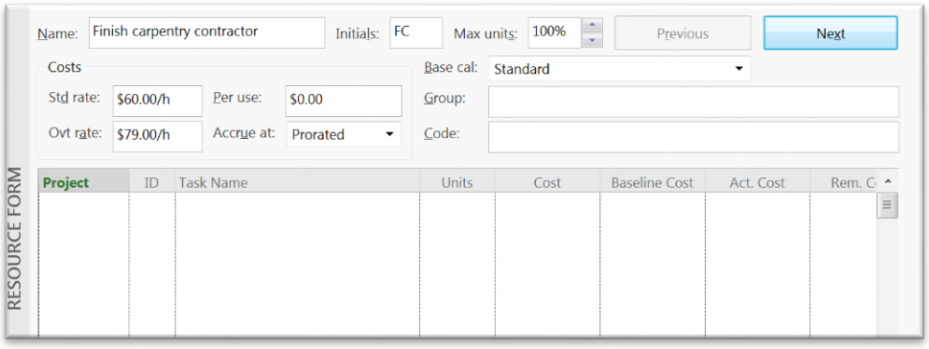


Exhibit 11: Resource Form in Microsoft Project Lacks Ability to Change Use Effectiveness.

LODR, as depicted as effective return over time in Exhibit 12, asserts that if equal increments of one variable input are added while keeping the amounts of all other inputs fixed, total production may increase; but after some point, the returns to the total product will decrease (Truett, 1998). Delays in raw material necessitated crashing the project late in the execution phase to mitigate weather related risks and to meet adjusted deadlines. This exacerbated the errors caused due to fatigue because even though more work was being accomplished as more hours were dedicated to the project – the added LODR variable in this single-resource case – more errors were being made. Rework took place of supplementary work and project Schedule Performance Index (SPI) dropped below acceptable threshold. The PM noted a trend of diminishing returns and opted to act by implementing OSHA-inspired overtime work rules when the project saw negative returns on time investment. This caused the postponement of finish work until Phase II of the project, descoping of the project and missed milestones, as the PM was too hesitant in put the progress restricting plan in place.

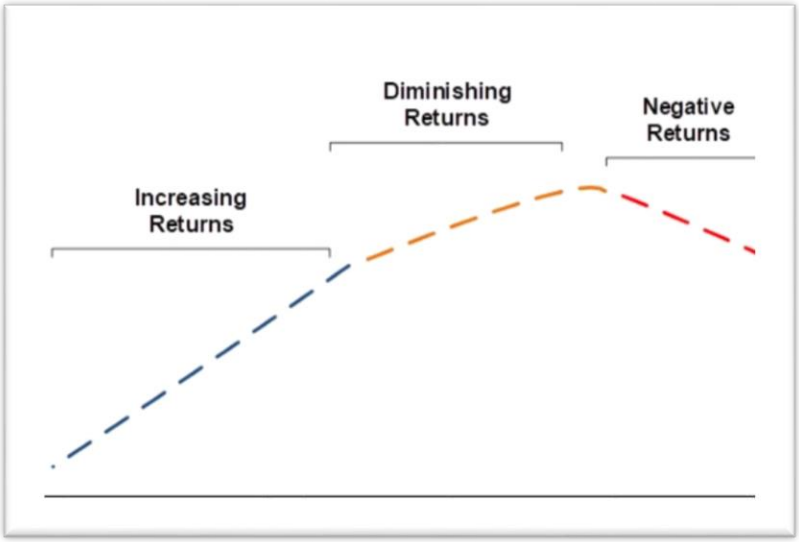


Exhibit 12: Law of Diminishing Returns (Quigley & Lack, 2020)

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Appendix A

Homeowners Association Survey

Is your existing shed on a permanent foundation?

- ❒ Yes
- ❒ No
- ❒ Unsure

What are horizontal dimensions of your shed?

- ❒ 5x8’
- ❒ 6x10’
- ❒ Unknown
- ❒ Other____

Is any part your shed or deck constructed within a rear or side setback?

- ❒ Yes
- ❒ No
- ❒ Unsure

How tall is your fence?

- ❒ 6 feet
- ❒ 8 feet
- ❒ Unsure

Does your shed / deck comply with lot-coverage rules?

- ❒ Yes
- ❒ No
- ❒ Unsure

Do shared-lot neighbors typically confer on placement or size?

- ❒ Yes
- ❒ No

Which attributes of an adjacent neighbor’s fence, deck or storage shed are likely to create compatibility or acceptability issues? (Rate according to importance)

- _ Matches the house
- _ Quality
- _ Size
- _ Height
- _ Does not block view
- _ Other _____

Appendix B

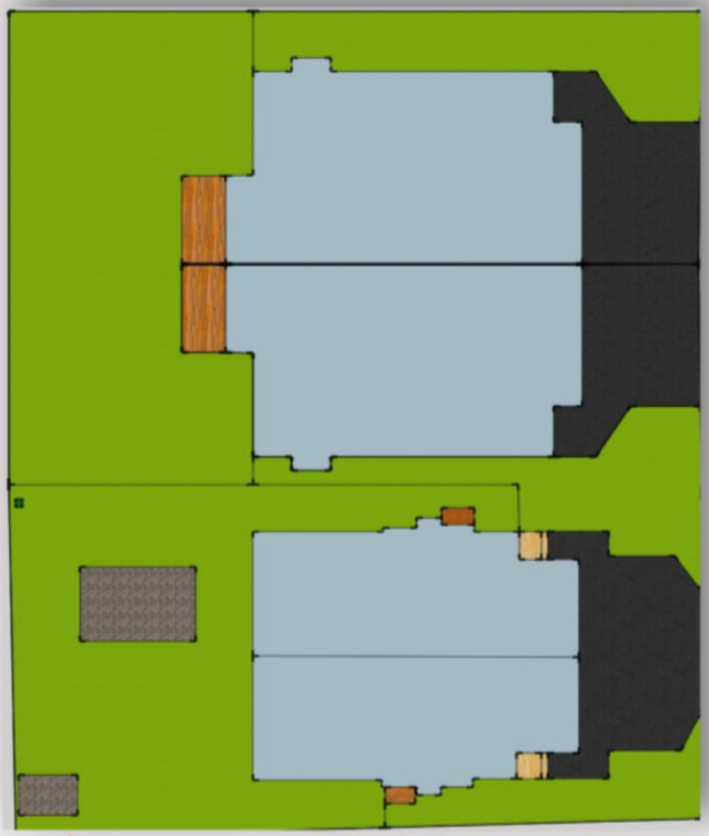
Homeowners Association Shed, Deck and Accessory Building Guide

WEST GATE

HOMEOWNERS ASSOCIATION FENCE, SHED, DECK AND ACCESSORY BUILDING GUIDE

Welcome to the West Gate community!

Please use this guide to help interpret how to apply Municipality of Anchorage building codes and definitions, and how to implement the covenants of the community. Neighborly placement of out buildings, fences and decks will help in compliance and avoid complaints.



No accessory building shall be erected within five feet of an adjacent / abutting / side lot line.

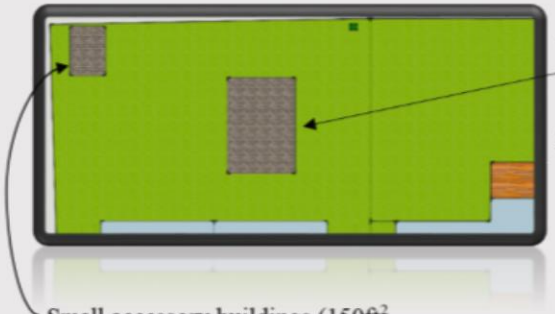
"Accessory buildings" include fences, sheds, greenhouses, decks and the like.

Remember!

Each set of West Gate condos resides on a single lot. As such, there is no restriction as to building proximity next to the "halfway" point of the back yard with your shared-lot neighbor.

However, if you don't share a wall, you should build no closer than five feet to the property line.

SHEDS, PLAYHOUSES & GREENHOUSES



Larger builds must be erected no closer than 10 feet from the main structure, cannot be built in utility easements, and require a permit and inspection if over 200ft^2 floor area.

All accessory buildings are limited to 12 feet (mean) height. Where to measure this varies by roof type.

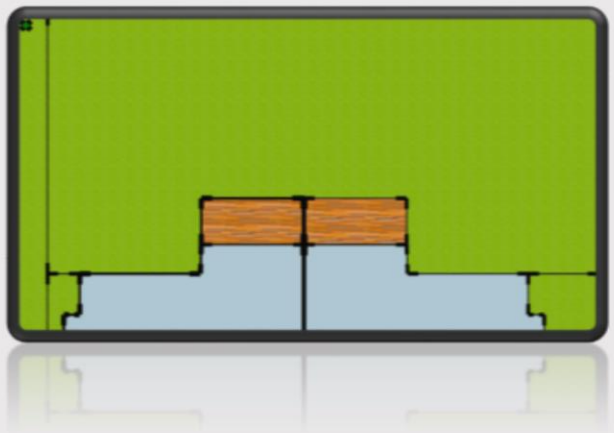
REF: AMC 21.70.090

Small accessory buildings (150ft^2 or less) with no permanent foundation are allowed in utility easements.

DECKS & LOT COVERAGE RULES

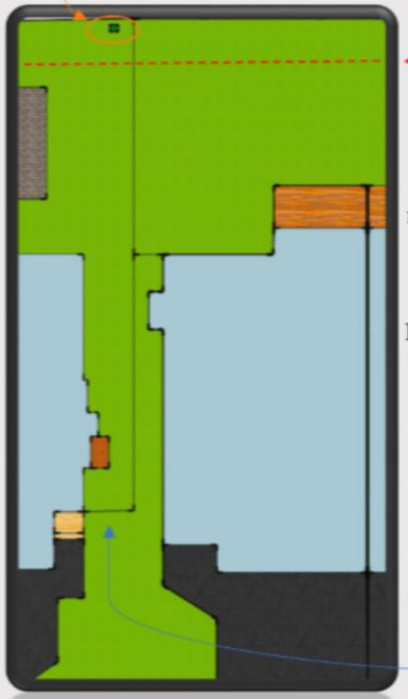
All deck plans must be submitted and approved by the HOA prior to construction.

Any portion of deck with a height exceeding 28 inches from grade (not including hand railing) deducts from the allowable 40% total lot coverage.



FENCES, LOT LINES, & EASEMENTS

Fences in easements require letters of non-objection from the utility companies, and in some cases an encroachment permit from the Municipality. See your West Gate Plat map for easements.



Fences are limited to eight feet in height, but many are built at six feet as the standard.

HOA approval is required for fence style, material and location.

Fences may not be built any closer to five feet aft of the front of the home.

In West Gate, your shared-wall neighbor has the right to 50% of the total lot coverage! If you're building a large shed or deck exceeding 28 inches in height, you should consult your neighbor as to their current or future build plans.

Appendix C

Communications Log

Stakeholder Communications Log - Maximum Footprint, Minimum Space: A Guide to Small-Lot Residential Accessory Building Construction

Communications Log

	Mode	Frequency	Level of detail	Format	Other helpful info	Contact 1	Contact 2	Contact 3	Contact 4	Contact 5	Contact 3	Contact 4	Contact 4	Contact 6	Contact 7
Internal Stakeholders															
Sponsor	In Person	Minimal	High Level	In Person	Live in. Talk anytime, but does not want anything to do with academic portion	14-Jan	21-Jan	14-Feb	27-Feb	10-Mar	18-Mar	24-Mar	2-Apr	6-Apr	
Professor Roger Hull	Email and in person	Frequent	Very	PDF / Word	Measure how my project is going - key interest. Will need to show Mastery at variation, risk and value metrics	3-Jan	23-Jan	28-Jan	5-Feb	16-Feb	27-Mar	30-Mar	3-Apr	6-Apr	9-Apr
Professor LuAnn Piccard	Email Prir, then phone	Every Other Week	Very	PDF / Word	Bullets day prior to discuss, scheduled through Keturah, then phone call	29-Dec	14-Jan	23-Jan	31-Jan	17-Feb	21-Feb	26-Feb	13-Mar	23-Mar	5-Apr
Bruce Davison, PE	In Person	Monthly	High Level	Word Docs to track progress	Will assist in formatting, writing and other academic areas only. May provide a Hold Harmless & Release Template	12-Feb	21-Feb	11-Mar	3-Apr	9-Apr	3-Sep				
External Stakeholders															
Anchorage Municipality	In Person	Once	Very	Hardcopy	Needs full description, to include depth levels of foundations on an as-built plat	13-Jan	7-Feb								
West Gate HOA	E Mail		Very	Hardcopy	Full description, with color pics, 3D visuals or mock ups. Must match CC&R requirements	2-Apr	15-May	25-Jun							
North Neighbor	In Person	At Milestones	High Level	In person walk through	Simple narrative in person. Will provide 3D mockups and other documentation to help move the needle from cautious to supportive	11-Feb	14-Feb	29-Feb							
South Neighbor	In Person	Monthly	Very	Everything	Would like a full explanation in person. Has considerable resistance due to poor experience with adjacent	13-Feb	14-Feb	19-Feb	29-Feb	15-Mar	10-Apr	14-May	15-Jun	22-Jun	17-Jul
Chugach Electric Association	Written	One time application	Per documentations	PDF and fillable online app	Must call 811 Diggers Hotline, then have them take a survey. Placement must match EXACTLY to where the shed is built if in the T&E easement	2-Apr									
Contractor 1	In Person	One time site survey	Per documentations	Plat, PDF via email	Needs full description, to include depth levels of foundations on an as-built plat	18 Feb									
Contractor 2	Email	One time site survey	Very, Will assist in planning	PDF	Needs snow removed to judge saddle in yard with level.	29-Jan	5-Feb	11-Mar	30-Mar	8-Apr	9-Apr				
Contractor 3	Email / Site Visit	One time site survey	Very, Will assist in planning	PDF / Pics	Big discount for single visit. Will need it completely mapped out within 1" of placing piers. Will provide "competent soil" measurements as they reach them while installing.	25-Jan	30-Mar	8-Apr	12-May						
Elecgtric Company 1	In Person	One time site survey	Per documentations	Plat, PDF via email	Needs full description, to include depth levels of foundations on an as-built plat	18-Feb									
Elecgtric Company 3	In Person	One time site survey	Very, Will assist in planning	PDF	Needs snow removed to judge saddle in yard with level.	29-Jan	5-Feb	11-Mar	30-Mar	8-Apr	9-Apr				
Elecgtric Company 3	Email / Site Visit	One time site survey	Very, Will assist in planning	PDF / Pics	Big discount for single visit. Will need it completely mapped out within 1" of placing piers. Will provide "competent soil"	25-Jan	30-Mar	8-Apr	12-May						

Appendix D

Change Control Log

CHANGE REQUEST INFORMATION					CHANGE IMPACT INFORMATION		CHANGE REQUEAST RESPONSE INFORMATION				
Change	Change Description	Responsible	Requestor	Date	Last Update	Impact	Impact Description	Approval Authority	Analysis	Status	Actions Required	Documents Update
C001	Change location of shed to accommodate utility easement	PM	Sponsor	14-Feb-20	15-Mar-20	L	Stakeholders will need to be engaged as view of shed and view blocking will be different	PM	Guide / Pamhplet allowed stakeholders and sponsor alike to see the required spacing and limited locaiton options	Approved	Updated Schedule & Budget. Execute Work	NA
C002	Change orientation of shed	PM	Sponsor	5-Apr-20	15-Apr-20	M	Charge of orientation will change the layout of the deck in phase 2	Sponsor	N-S vs E-W orientation allowed for access to shed directly from Phase 2 Deck, as well as blocking more view into the master bedroom (as was requested)	Approved	Updated Schedule & Budget. Execute Work	NA
C003	Footings required to be Helical Piers from rock or concrete due to easement and soft soil	PM	PM	14-Apr-20	15-Apr-20	H	Direct and substantial impact to budget. $2,700 (32%) additional cost	Sponsor	Delivery access restricted all available options other than the small hydraulic drill press. Soft soil, as expected, required the use of the most expensive footings. Extra weight required 6 rather than 4 footings and an increased cost to the project of $2,700.	Approved	Rebaselined project	PMP Change to reflect new budget. Risk Register / Realized Risks updated
C004	Add additional windows	PM	Sponsor	20-May-20	13-Aug-20	L	Additional cost fo $235/window	PM	Additional windows helped the design and feel of a more open area, descreased the need for two interior lights, and allowed for better sponsor buy-in	Approved	Ordered new windows	Change control
C005	Change roof to skillion design	PM	Sponsor	15-Jun-20	20-Aug-20	H	Change in roof type will increase overall height, increase storage, descrease visibility around the structure, and shade the yard. $1,300 increase to budget due to mateials and additional windows	Sponsor	Descreased complexity in roof and shingle install. Increased cost in raw material as 2x4 became 2x10x20 foot to account for the angle. Total increase of $1,300 for material and windows was approved. Increase of 48sq ft of loft storage	Approved	Resdeisgn, reframe, additional and longer support system. Easier build, additional window orders.	Project Gantt and Cost Analysis / EVM update
C006	Add skylights to roof	PM	Sponsor	11-Jul-20	15-Jul-20	M	Additional $595 in costs	Sponsor	Request for sponsor was considered gold plating for little additional benefit, too much added cost and complexity for roof and water sealing	Disapproved	No value add	NA - Disapproved
C007	Add rock paneling to shed bottom to increase quality of the look/build	PM	Sponsor	13-Aug-20	16-Sep-20	H	Additional $2,845 cost to increase strictly the asthetics. Increased buy-in from opposed staekholders	Sponsor	PM considers it gold plating as there is no structural benefit and a fairly large cost increase. Sponsor advises that she is willing to increase the cost and scope of work to allow for this ashtetic addition.	Approved	Order and haul additional material.	PMP Change to reflect new budget. Risk Register / Realized Risks updated
C008	Add solar panels to roof	PM	PM	15-Aug-20	25-Aug-20	H	Additional $4,400 in costs with potential sell-back to Chugach	Sponsor	Well outside scope, and would push completion too late into a season that has very little use for solar. No solar / EV use. Minimal research into sellback to Chugach	Disapproved	Insufficient ROI, research or need	NA - Disapproved

Appendix E

West Gate HOA Article XII: Additions, Alterations and Improvements

ARTICLE XII
ADDITIONS, ALTERATIONS AND IMPROVEMENTS

Section 12.1 - Additions, Alterations and Improvements by Unit Owners.

(a) No Unit Owner will make any structural addition, structural alteration, or Improvement in or to the Unit that affects the Common Elements without the prior written consent thereto of the Executive Board in accordance with **Section 12.1(c)**.

(b) Subject to **Section 12.1(a)**, a Unit Owner:

(i) May make any other Improvements or alterations to the interior of his or her Unit that do not impair the structural integrity or mechanical systems or lessen the support of any portion of the Common Interest Community;

(ii) May construct or enlarge decks in their Limited Common Element yard area upon approval from the Executive Board. Decks must comply with all local ordinances and regulations and shall be completed in a professional workmanlike manner.

(iii) May not change the appearance of the Common Elements, or the exterior appearance of a Unit or any other portion of the Common Interest Community, without permission of the Association; and

(iv) After acquiring an adjoining Unit or an adjoining part of an adjoining Unit, may remove or alter any intervening partition or create apertures therein, even if the partition in whole or in part is a Common Element, if those acts do not impair the structural integrity or mechanical systems or lessen the support of any portion of the Common Interest Community. Removal of partitions or creation of apertures under this subsection is not an alteration of boundaries.

(c) A Unit Owner may submit a written request to the Executive Board for approval of actions prohibited by **Section 12.1(a)** or **12.1(b)**. The Executive Board shall answer any written request for such approval, after Notice and Hearing, within sixty (60) days after the request thereof. Failure to do so within such time shall not constitute consent by the Executive Board to the proposed action. The Executive Board shall review requests in accordance with the provisions of its Rules.

Appendix F

Requirement Traceability Matrix

Requirements Traceability Matrix

Project : Maximum Footprint, Minimum Space: A Guide to Small-Lot Residential Accessory Building Construction					**Initiated by: Edward Conner**		**Revision Date and Reason for Revision: 5 Dec 20**		
Project Manager: Edward Conner		**Sponsor: TS**			**Approved by: Sponsor**		**Finalizing Project for Closeout**		
Program: PM686A		**Version Final**			**Approval Date: 9 Apr 20**				
High Level Requirements	Sub-devliverable	Lowest Level Deliverable	Requirement Description	Acceptance Criteria / Measure	Stakeholder	Work Package ID	Owner	Status	Complete
Project Initiation	Create Project Charter	Create Project Scope Statement	Signed Letter from Sponsor supporting the scope of the project	Letter of Support from Sponsor	Tracy Stanley (Sponsor)	1.2	PM	Signed Letter of Support signed 22 Jan 2020	✓
	Initial PMP Sub plans	Committee Selection Form	Select and Confirm Committee	Sign Expectation Agreement	Professor Roger Hull (Advisor)	1.2, 1.13, 1.4, 1.5, 1.6,	PM	Letter of Expectation Agreement / Contract sgined (24 Jan PM, 28 Jan Advisor Hull, 21 Feb Piccard, 6 Apr Davison)	✓
	Create Stakeholder Register	Required Traceability Matrix	Comprehensive RTM	Per grading rubric	Professor LuAnn Piccard (Committee Chair)	1.7	PM	Complete to PPM4 standards. Awaiting feedback prior to turn in…	✓
	Initial Schedule and WBS	Sub Plans for review	Weekly update and revision	Weekly email to discuss and implement into next PPM	Bruce Davison, PE	1.8, 1.9	PM	Several iterations of updates applied to PMP	✓
	Plat review	Phone discussion	Required application and fees	Official documentation and file with city for non-objection of build	Anchorage Municipality	2.2.1-2.2.11	PM	Documentation received 22 Jan 2020, likely not going to pursue easement encroachment.	✗
	Application for ARTICLE XII waiver	Email describing change	All associated data to support the final phase of construction	No set delivery format. Sign off from HOA BOD or 60 Days auto acceptance	West Gate HOA	NR	PM	Full packet supplied to Dwell Realty (Management Company) on 3 Apr 19. Auto approval 1 June 2020	✓
	In person interview	Site Plan	3D sketch of planned location and type of fence and shed	Code references for any areas of encroachment	North Neighbor	2.3.5	PM	Interview went well. Lowered them on power / interest slid to supportive.	✓
	In person interview	Hold Harmless & Release	Educate on what is required, the planned sq footage and what will be remaining for her future use	Avoid her neighbor's violations / setback breach	South Neighbor	2.3.5	PM	Interview and educational time went very well. Approved 70% lot coverage for spoonsor to use. Awaiitng Hold Harmless…	•••
	Line Locate	Site Survey	LS Permit Application and Fee	Obtain Letter of Non-Object T&E Easement	Chugach Electric Association	2.2.2	PM	Documentation received, likely not going to pursue easement encroachment	✓
	Plat review	T&E easement wiaver	To scale as-built, exact location of planned easement encroachment	Chapter 21 MOA Code R2A-SL	Land and Zoning Admin	2.2.9	PM	Documentation received, likely not going to pursue easement encroachment	✓
	Plat review	Site Survey	Email with sketch and $100 fee	$100 fee	AK Deck & Fence	2.2.6	PM	Contacted 11 Mar, 30 Mar, 9 Apr . Ingress routing does not allow dump truck or trailer	✓
	Plat review	Site Survey	Formal request for services, sketch, outline of planned needs	Signed 2020 Work Agreement	Techno Metal Post	2.2.5	PM	Alll documentation signed 30 Mar	✓

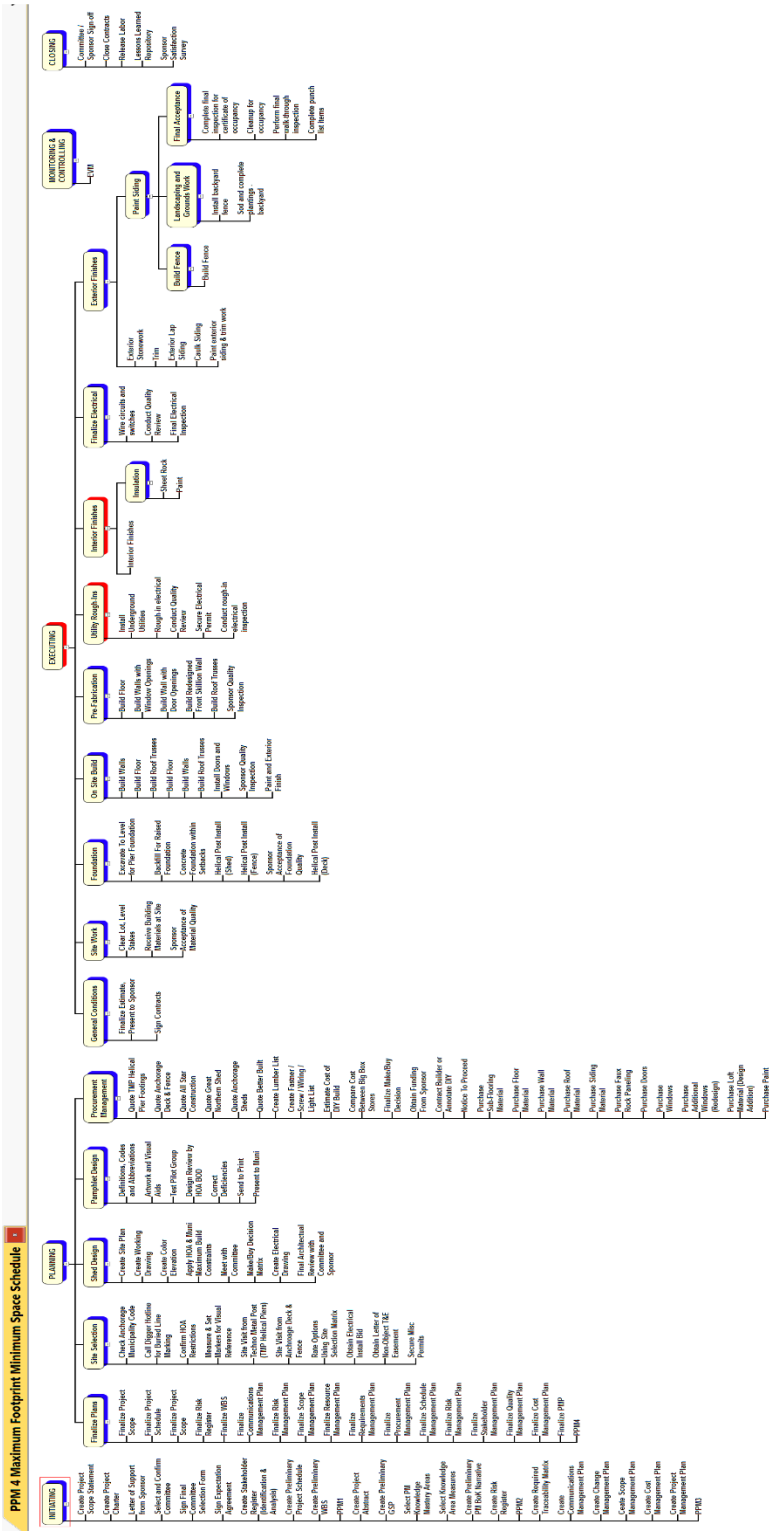
High Level Requirements	Sub-devliverable	Lowest Level Deliverable	Requirement Description	Acceptance Criteria / Measure	Stakeholder	Work Package ID	Owner	Status	Complete
PM686A Academic Requirements	Establish Project Identity	Title	Academic, searchable	Title must match all documents	Professor Roger Hull (Advisor)	1.1	PM	Version one denied. Version two accepted and on all documents	✓
	Select PM Knowledge Mastery Areas	3-4 Knowledge Areas	Deep dive into PM areas that will be utilized during 686A only	Professors Piccard and Hull Approval and grading rubic	Professor Roger Hull (Advisor)	1.13	PM	Submitted 21 Feb, updated 13 Mar to remove Procurement Management and communication management due COVID-19 restrictions	✓
	Create GSP	Title must be perfect	All graduate study plans reference the appropriately titled docuemtn ver batim	Professors Piccard and Hull Approval and grading rubic	Professor Roger Hull (Advisor)	1.12	PM	V0 Submitted January, updated 24 Mar 20	✓
	PPM1	Prelim	Per Syllabus	Professors Piccard and Hull Approval and grading rubic	Professor LuAnn Piccard (Committee Chair)	1.1	PM	Submitted 31 Jan 20, 1413L	✓
	PPM2	Revised	Per Syllabus	Professors Piccard and Hull Approval and grading rubic	Professor LuAnn Piccard (Committee Chair)	1,17	PM	Submitted 21 Feb 20, 1343L	✓
	PPM3	Near Final	Per Syllabus	Professors Piccard and Hull Approval and grading rubic	Professor LuAnn Piccard (Committee Chair)	1.24	PM	Submitted 13 Mar 20, 1541L (11 Minutes Late)	✓
	Research Methodologies and Data Analysis	Description of Surveys and Interviews	Deep dive into research that will be conducted, measures utilized	Formal email acceptance	Professor Roger Hull (Advisor)	2.1	PM	Two versions sent, approved and filed 6 Apr 2020	✓
	PPM4	Final Gradeable	Per Syllabus	Professors Piccard and Hull Approval and grading rubic	Professor LuAnn Piccard (Committee Chair)	2.1.18	PM	Due 10 Apr…	✓
	Final Presentation	PowerPoint	Per Syllabus	Professors Piccard and Hull Approval and grading rubic	Professor LuAnn Piccard (Committee Chair)	2.1.18	PM	Due 20 Apr…	✓
	All Documents Binder	Printed booklet	Delivered per guidelines described in Materials section of Blackboard	Professors Piccard and Hull Approval and grading rubic	Professor LuAnn Piccard (Committee Chair)	Rescinded	PM	Rescinded due COVID	✗
High Level Requirements	Sub-devliverable	Lowest Level Deliverable	Requirement Description	Acceptance Criteria / Measure	Stakeholder	Work Package ID	Owner	Status	Complete
Pamphlet Design	Identify Knowledge Gaps	Survey & Interviews	Find the most applicable and beneficial areas for homeowners	Through multiple iterations of guides, comparing to others, researching adult learning	Professor Roger Hull (Advisor)	2.4	PM	Complete	✓
	Industry	Survey & Interviews	Add to PMBOK	Meet or exceed industry best practices / examples	Professor LuAnn Piccard (Committee Chair)	2.4	PM	Complete	✓
	Code and Regulation Search	Definitions, Codes and Abbreviations	MOA Zoning (Chap 21) & HOA Regulations defined	Meet or exceed all code requirerments	Anchorage Municipality	2.4	PM	Complete	✓
	Adult Learning Theory	Artwork and Visual Aids	Single front/back design	Final iteration through survey and usability reports	PM	2.4	PM	Complete	✓
	Design Review by HOA BOD	Packet for review - no set template	Must help users meet CC&R description, size, style and fit and finish	HOA BOD Approval for use	West Gate HOA	2.4	PM	BOA Approval Receive 29 Sept 20	✓

High Level Requirements	Sub-devliverable	Lowest Level Deliverable	Requirement Description	Acceptance Criteria / Measure	Stakeholder	Work Package ID	Owner	Status	Complete
Research and Data Analysis	Site Survey	Site Plan	Survey non development area for most sound footings Research Options	Sleect best footing for the soft soil	PM	2.2.5	PM	Complete	✓
	Survey to HOA	Finalized Site Plan on Grade	Deliver site plan, analyze neighborhood shed sizes	Project shed conforms to HOA standards	PM	2.3.1-2.3.8	PM	Complete	✓
	Law and Codes	Chapter Annotations of Restrictions	Select and reserarch MOA AMC that apply to buildilng.	Apply to site, buildling dimensions	PM	2.2.1	PM	Complete	✓
	Stakeholder Mng	Power- Interest Grid	Analyze supporting and opposing	All major players input	PM	2.1.14	PM	Complete	✓
	Risk Register	Risk Evaluation	Research construction methods and errors and common faults	Minimum of 10 threats	PM	2.1.4	PM	Complete	✓
High Level Requirements	Sub-devliverable	Lowest Level Deliverable	Requirement Description	Acceptance Criteria / Measure	Stakeholder	Work Package ID	Owner	Status	Complete
Construction Deliverables	Final Architectual Review with Committee and Sponsor	Approve or Redesign	Full site plan with orientation and size	Sponsor Accepts, with no limitations due MOA Codes or HOA	Sponsor	2.5.14	PM	Notice to Proceed received	✓
	T&E Easement	Approval Letter	Approval to Proceed	NR	Anchorage Municipality	--	PM	Reposition outside T&E easement does not require Muni approval	✓
	Approval Letter	Design letter and diagram	Full description funnelled through property management	Accepted by HOA as is or with adjustments	West Gate HOA	2.4.1	PM	Approved by HOA (Receipt	✓
	Foundation Survey	Footing Selection	Survey non development area for most sound footings (concrete, rock or helical piers)	Engineered Acceptance / Spoil Sample	Techno Metal Post	2.5.1	PM	No other option than Helical Piers due soft soil and lack of approach for large dump trucks	✓
	Fence Plan	NR	Pass to Phase II	NR	South Neighbor	NR	PM	Pass to Phase II	✓
	Shed Design	Quote	Inactive	No Quote Received	AK Deck & Fence	2.5	PM	Inactive	✓
	Shed Quotes	Quote	Inactive	No Quote Received	Better Built, AK Tough,	2.5	PM	Inactive	✓
	Finalize Make/Buy Decision	Decision	Compare quotes	Lowest amount wins	Sponsor	2.3.6	PM	"Make" decision shows benefits	✓
	Contract Builder or Annotate DIY	DIY	DIY	DIY	Sponsor	2.3.6	PM	DIY	✓
	Estimate Cost of DIY Build	Compare Cost at Lowes and HD	<$	Lowest amount wins	Sponsor	3.1.1	PM	Complete	✓
	Notice To Proceed	Obtain Funding / Contract Builder	Signed letter from sponor approvaing	Accepted per final plat and diagrams	Sponsor	3.1.1	PM	Complete	✓

High Level Requirements	Sub-devliverable	Lowest Level Deliverable	Requirement Description	Acceptance Criteria / Measure	Stakeholder	Work Package ID	Owner	Status	Complete
Execution	Sign Contracts	Contract	Legal	Accpeted by sponsor and signed by both parties	Sponsor	2.1	PM	Foundation / Utilities only	✓
	Site Work	Level Site	Large, level location	Must accommodate shed	PM	2.2	PM	Complete	✓
	Foundation	25+ year foundatoin	Foudnation for build	Code and location allowed	Techno Metal Post	2.3	PM	Complete. Six Helical piers installed on schedule	✓
	Pre Fabricated Build	whole-shed build	Needs access to drop off	Needs full access, pre-built with lead time	Better Built, AK Tough,	2.4	PM	Did not receive bid as no access for truck drop off	✗
	On Site Build	DIY Build on site	In absence of allowable off site build	Must be below DIY cost	Sponsor	2.5	PM	No Objection letters to site location or HOA restriction - Approved by HOA 29 Sept 20	✓
	Utility Rough Ins	Electrical 20A at minimum	Must have full electrical panel install or at a minimum one, 20A	Accepted by MOA	Land and Zoning Admin	2.6	PM	25 Oct 20 Complete	✓
	Interior Finishes	Doors, windows	Must allow for ventalation	Power, ventalated windows	North Neighbor	2.7	PM	Not Complete, Weather	✗
	Utility Lines	Lines for power, AV and security	Must have three lines, 1 1.5", 2 1.0"	Accepted by code inspection	Chugach Electric Association	2.8	PM	Unable to fill trench due weather. Lines run for power only.	...
	Paint	All exterior painted	Must match	Must match house per HOA	Sponsor	2.9	PM	Unable due weather. Deferred	✗
	Landscaping	Landscaped	Must match home landscaping	Must hide any areas of foundation	Sponsor	2.9.2	PM	Unable due weather. Deferred	✗
	Fence	6' Privacy	Full enclosure of back yard	6' with two man gates and one large exit drive gate	AK Deck & Fence	NA	PM	Descoped. Did not receive bid from Deck and Fence	✗
High Level Requirements	Sub-devliverable	Lowest Level Deliverable	Requirement Description	Acceptance Criteria / Measure	Stakeholder	Work Package ID	Owner	Status	Complete
PM686B Academic Requirements	Update Documents	Per Syllabus	All documents must have final updates prior to 7 Dec 20	All documents updated prior to final submission	PM	NA	PM	Complete	✓
	Update GSP	Per Syllabus	Per UAA Policy	Exaxt title match is a must	Academic Staff (KC)	NA	PM	Complete per Syllabus, Graded	✓
	PPM1	Per Syllabus	Per Syllabus	Acceptable per Syllabus and grade	Professor LuAnn Piccard (Committee Chair)	NA	PM	Complete per Syllabus, Graded	✓
	PPM2	Per Syllabus	Per Syllabus	Acceptable per Syllabus and grade	Professor Roger Hull (Advisor)	NA	PM	Complete per Syllabus, Graded	✓
	PPM3	Per Syllabus	Per Syllabus	Acceptable per Syllabus and grade	Professor LuAnn Piccard (Committee Chair)	NA	PM	Complete per Syllabus, pending grade	...
	PPM4	Per Syllabus	Per Syllabus	Acceptable per Syllabus and grade	PM	NA	PM	Late Submission, pending grade	...

Appendix G

Work Breakdown Structure



Appendix H

Project Management Plan

-- Included on next page due to formatting --